

A Review of the Water Quality in Beaver Lake Watershed

Beaver Lake Watershed Symposium • September 25, 2015



What is the 303(d) list?

- List of waters currently **not**
 - Supporting a designated use or
 - Attaining water quality standards or criteria
- ADEQ must compile a 303(d) list every 2 years and submit the list to EPA for approval



Designated Uses and Water Quality Standards



Section 303(c) of the Clean Water Act:

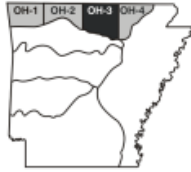
- Requires states to adopt water uses (Designated Uses) consistent with the Clean Water Act
 - Designated uses are those uses specified in water quality standards for each waterbody whether or not they are being attained
 - Existing uses are those uses actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the water quality standards
- Requires states to establish water quality standards to protect the designated uses of each waterbody

Designated Uses






- Extraordinary Resource Waters (ERW)
- Ecologically Sensitive Waterways (ESW)
- Natural and Scenic Waterways
- Fisheries (Aquatic Life)
- Primary Contact Recreation (swimming)
- Secondary Contact Recreation (wading)
- Drinking Water
- Agriculture and Industrial Water Supply

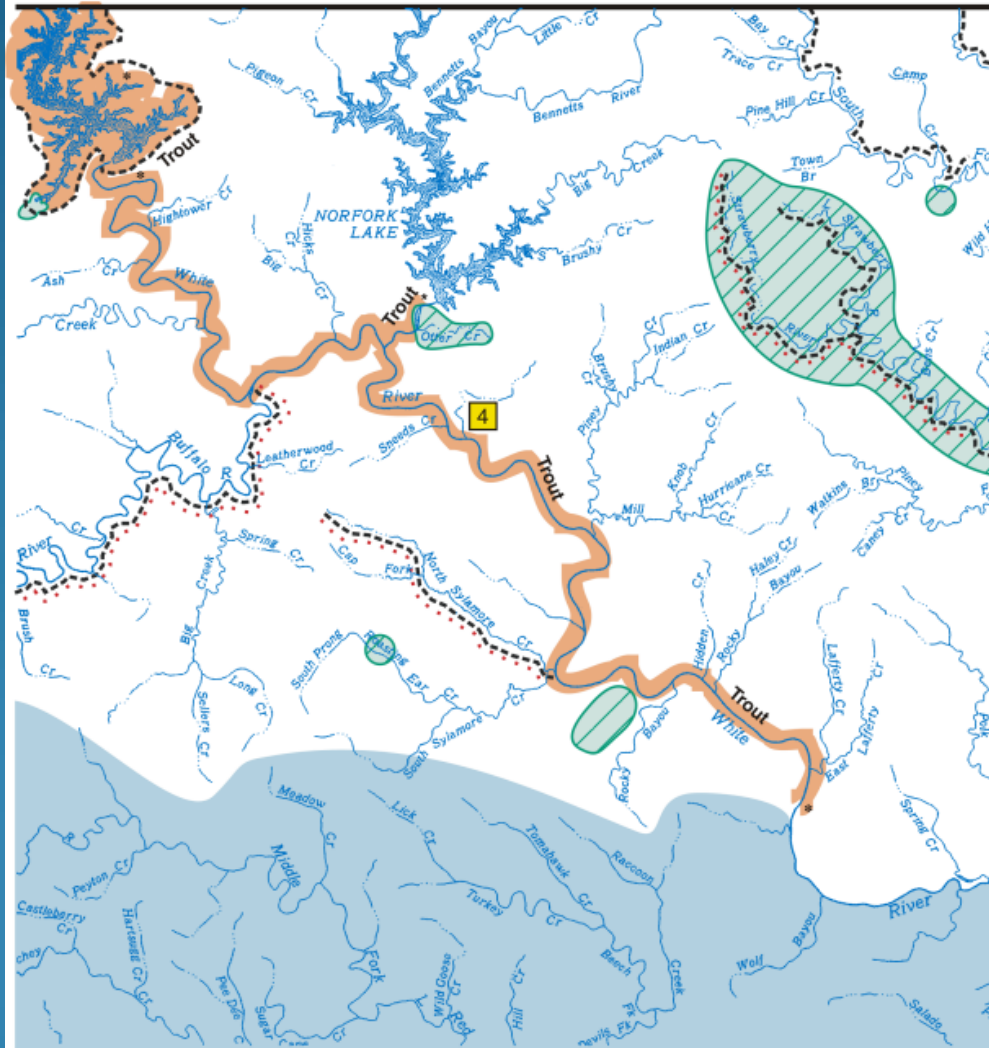


Plate OH-3 (Ozark Highlands)



LEGEND

-  - Ecologically Sensitive Waterbodies
-  - Trout Waters
-  - Extraordinary Resource Waters
-  - Natural and Scenic Waterways
-  - Variation by UAA



DESIGNATED USES: OZARK HIGHLANDS ECOREGION
(Plates OH-1, OH-2, OH-3, OH-4)

Extraordinary Resource Waters

Current River (OH-4)
Eleven Point River (OH-4)
Strawberry River (OH-3, OH-4)
Spring River, including its tributaries: Field Creek, Big Creek, English Creek, Gut Creek and Myatt Creek (OH-4)
South Fork Spring River (OH-3, OH-4)
North Sylamore Creek (OH-3)
Buffalo River (OH-2, OH-3)
Kings River (OH-2)
Bull Shoals Reservoir (OH-2, OH-3)

Natural and Scenic Waterways

Strawberry River from headwaters to Sharp-Izard County Line (OH-3, OH-4)
Kings River - that segment in Madison County (OH-2)
Buffalo River (OH-2, OH-3)
North Sylamore Creek (OH-3)*

Ecologically Sensitive Waterbodies

Numerous springs and spring-fed tributaries which support southern cavefish, Ozark cavefish, Arkansas darter, least darter, Oklahoma salamander, cave snails, cave crawfish and unique invertebrates (OH-1, OH-2, OH-3)
Strawberry River - location of Strawberry River darter (OH-3, OH-4)
Spring River - snuffbox and pink mucket mussels; Ozark hellbender (OH-4)
Eleven Point River - location of Ozark hellbender (OH-4)
Current River - location of flat floater and pink mucket mussels (OH-4)
Illinois River - Neosho mucket (OH-1)

Primary Contact Recreation - all streams with watersheds of greater than 10 mi² and all lakes/reservoirs

Secondary Contact Recreation - all waters

Domestic, Industrial and Agricultural Water Supply - all waters

Fisheries

Trout

Bull Shoals Reservoir - lower portion (OH-2)
White River from Bull Shoals Dam to Dam #3 (OH-3)
North Fork White River (OH-3)
Spring River from Mammoth Springs to South Fork Spring River (OH-4)
Upper White River from Beaver Dam to State Line (OH-1)

Lakes and Reservoirs - all

Streams

Seasonal Ozark Highlands fishery - all streams with watersheds of less than 10 mi² except as otherwise provided in Reg. 2.505
Perennial Ozark Highlands fishery - all streams with watersheds of 10 mi² and larger and those waters where discharges equal or exceed 1 CFS

* As designated in the National Wild and Scenic Rivers System

Use Variations Supported by UAA or Other Investigations

- Railroad Hollow Creek - no fishable/swimmable uses (OH-1, #1)
- Columbia Hollow Creek - seasonal fishery March-June (OH-1, #2)
- Curia Creek - below first waterfall, perennial fishery (OH-4, #3)
- Moccasin Creek - below Highway 177, perennial fishery (OH-3, #4)
- Stennitt Creek- from Brushy Creek to Spring River, no domestic water supply use (OH-4)

SPECIFIC STANDARDS: OZARK HIGHLANDS ECOREGION
(Plates OH-1, OH-2, OH-3, OH-4)

	<u>Streams</u>	<u>Lakes and Reservoirs</u>
Temperature °C (°F)*	29 (84.2)	32 (89.6)
Trout waters	20 (68)	
Turbidity (NTU) (base/all)	10/17	25/45
Minerals	see Reg. 2.511	see Reg. 2.511
Dissolved Oxygen**	<u>Pri.</u> <u>Crit</u>	see Reg. 2.505
<10 mi ² watershed	6 2	
10 to 100 mi ²	6 5	
>100 mi ² watershed	6 6	
Trout waters	6 6	

All other standards (same as statewide)

Variations Supported by UAA

- Railroad Hollow Creek: from headwaters to Spavinaw Creek - year-round dissolved oxygen - 2 mg/l (OH-1, #1)
- Curia Creek - below first waterfall, critical season D.O. 6 mg/l (OH-4, #3)
- Moccasin Creek - below Highway 177, critical season D.O. 5mg/l (OH-3, #4)
- SWEPCO Reservoir - maximum temperature 54°C (limitation of 2.8°C above natural temperature does not apply) (OH-1, #5)
- Stennitt Creek - from Brushy Creek to Spring River, TDS = 456 mg/l (OH-4, #6)

Water Quality Standards

- Numeric Standards

<u>ALL WATERBODIES - HUMAN HEALTH CRITERIA</u>	
<u>Substance</u>	<u>Criteria (ng/l)*</u>
Dioxin (2,3,7,8 TCDD)	0.001
Chlordane	5.0
PCBs (polychlorinated biphenyls)	0.4



- Narrative Standards

Reg. 2.509	Nutrients
Materials stimulating algal growth shall not be present in concentrations sufficient to cause objectionable algal densities or other nuisance aquatic vegetation or otherwise impair any designated use of the waterbody. Impairment of a waterbody from excess nutrients are dependent	

List Development

1. Collect data from stream segments, assemble and evaluate all existing and readily available water quality data.
2. Assess data based upon Regulation No. 2 and the
3. “Assessment Methodology”
 - a. Regulation No. 2 provides the value
 - b. Assessment Methodology provides the procedure
4. Make a “Support” or “Non-Support” determination
5. Compile 303(d) List
6. Public Notice
7. Submit to EPA on or before April 1 every other year



Water Quality Monitoring Network

Ambient Surface Water Network

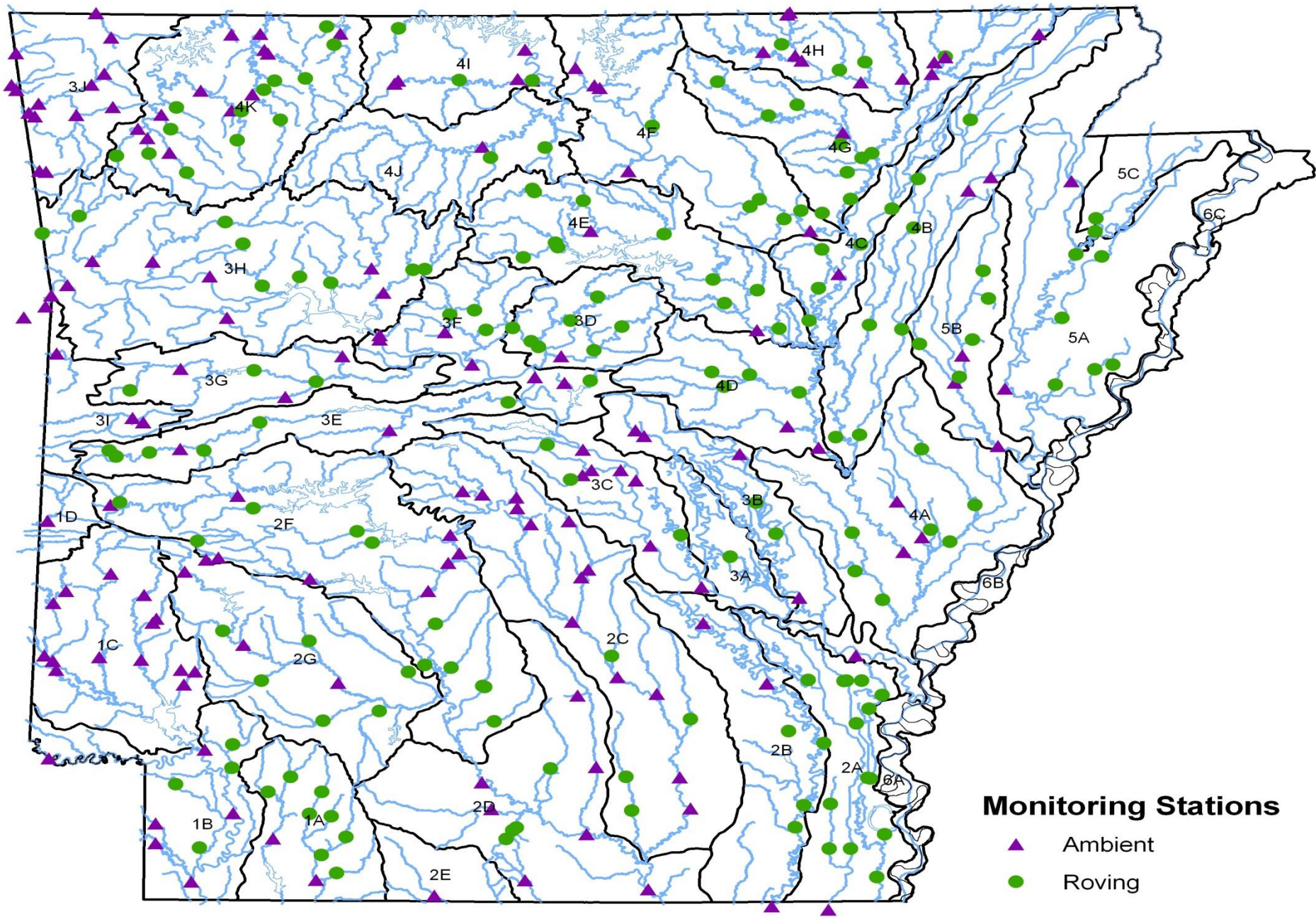
- Approximately 150 stations
- Chemical parameters & flow
- Sampled monthly
- ~25-30 years of data

Roving Surface Water Network

- Approximately 200 stations
- Waters with limited or no WQ data
- Sampled every other month for 2 years, then move on

Special Projects





Watershed Monitoring Network

Macroinvertebrate Community

Watershed Based

20 – 30 sites

Statewide

100+ sample/year



Fish Community

Watershed Based

10 – 20 sites

Statewide

30+ sample/year

Assessments



Parameter	Support	Non-support
Temperature	$\leq 10\%$	$> 10\%$
DO	< 5 samples or $\leq 10\%$	$> 10\%$
pH	$\leq 10\%$	$> 10\%$
Turbidity	$\leq 25\%$	$> 25\%$

Example: 60 Temperature measurements were taken at a station representing a particular stream segment during the period of record.

If 6 samples exceed the criteria  **SUPPORT**

If 7 samples exceed the criteria  **NON-SUPPORT**

Assessments



6.9 Nutrients

(B) Site Specific Nutrient Standards

Lake	Chlorophyll a ($\mu\text{g/L}$)**	Secchi Transparency (m)***
Beaver Lake*	8	1.1

**These standards are for measurement at the Hickory Creek site over the old thalweg, below the confluence of War Eagle Creek and the White River in Beaver Lake.*

***Growing season geometric mean (May-October)*

****Annual Average*

Assessments



LISTING METHODOLOGY FOR BEAVER LAKE:

The upper portion of Beaver Lake will be listed as non-support of its drinking water designated use when there are three or more (≥ 3) exceedances of the chlorophyll *a* criteria within the five-year period of record. Samples collected 1.0 meter below the surface of the water will be used to make lake and reservoir attainment decisions.

The upper portion of Beaver Lake will be listed as non-support of its drinking water designated use when there are three or more (≥ 3) exceedances of the secchi transparency criteria within the five-year period of record.

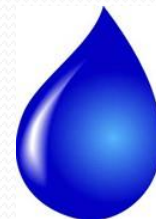
DELISTING METHODOLOGY FOR BEAVER LAKE:

The upper portion of Beaver Lake will be listed as supporting its drinking water designated use when there are no more than two (2) exceedances of the chlorophyll *a* criteria *and* no more than two (2) exceedances of the secchi transparency criteria within the five-year period of record. Samples collected 1.0 meter below the surface of the water will be used to make lake and reservoir attainment decisions for chlorophyll *a*.

305(b) Report Listing Format

Five Categories of Waters:

1. All designated Uses and water quality standards are met
 - 1B: TMDL has been completed, but now meeting
2. Some uses and standards met, insufficient data to assess other uses
3. Insufficient data to assess any uses
4. Water impaired, does not require a TMDL:
 - 4A: a TMDL has already been completed
 - 4B: other pollution control requirements will result in WQ standards attainment
 - 4C: impairment is not caused by a pollutant



305(b) Report Listing Format

Five Categories of Waters:

5. Waters not meeting WQ standards (303(d) List)

High

Truly impaired, TMDL needed

Medium

Adoption of new regulations or standards

Questionable data

Data verification needed

Impairment caused by a point source

Low

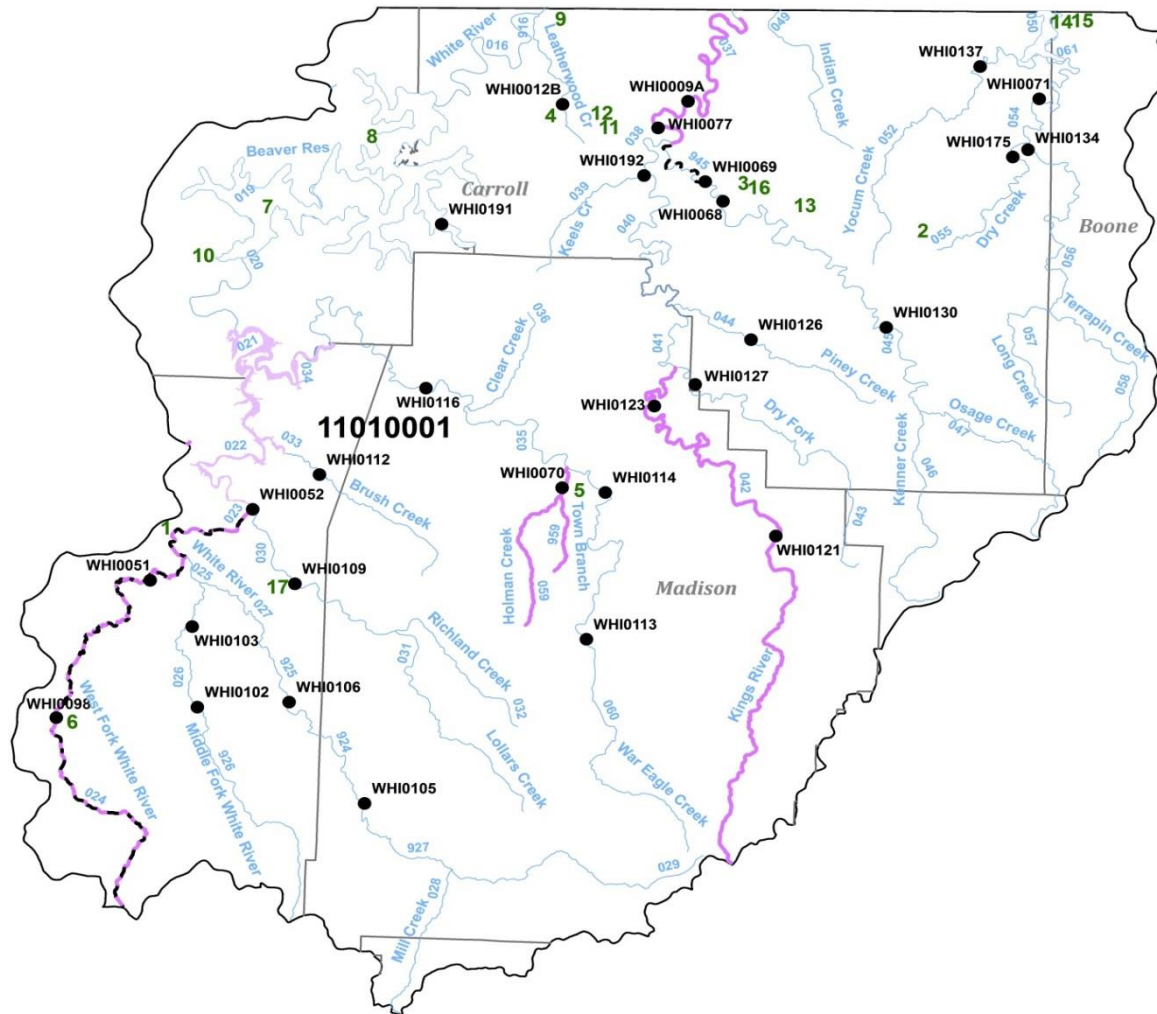
Impairment is naturally occurring

ADEQ did not support the listing (EPA added)



So, how's the water quality?





- # 2014 Active NPDES Permitted Facilities
- Monitoring Stations
- Draft 2014 303(d) list Category 5 Lakes
- Draft 2014 303(d) list Category 4a Lakes
- - - Draft 2014 303(d) list Category 4a Streams
- Draft 2014 303(d) list Category 5 Streams

De-Listing of Waters

- Develop a TMDL
- Implement control strategies (other than a TMDL)
- Updated assessments indicate no known impairments
- Improved delineation of impaired waterbodies
- Improved water quality standards and assessment methodologies



Status of Current TMDLs

- West Fork White River (turbidity)
 - BWA and AWRC submitted data to ADEQ for 2016 cycle
 - Under review
- Town Branch-Holman Creek (nitrate)
 - No Change



Other Water Quality Activities

- Use Attainability Analyses and Third Party Rulemakings
 - White River (City of Fayetteville)
 - Proposed SSC for Chloride, Sulfate, and TDS
 - Town Branch/Holman Creek/War Eagle Creek (City of Huntsville)
 - Proposed SSC for Chloride, Sulfate, and TDS



Other Water Quality Activities

- Act 335 of 2015
 - Nutrient Trading Advisory Panel
- ADEQ developing nutrient criteria for ERWs



Questions

501-682-0661

wentz@adeq.state.ar.us